

FREQUENCY OFFSET DETECTOR FOR AFC UNDER RAYLEIGH FADING

Abstract

A frequency offset detector for AFC under Rayleigh fading. The AFC includes a variable phase generator, an exponential term $e^{j \Delta \omega t}$ multiplied on an incoming signal, a low-pass filter, a gain amplifier, a multiplier, and an offset detector. The offset detector includes a filter, an amplifier, a delay block, three adders, and two blocks that output the absolute value of an inputted signal. The filter is a Finite Impulse Response (FIR) filter that produces a Hilbert Transformation of the inputted complex gain. The Hilbert FIR filter, together with the complex gain and two of the adders, generate two complex signals: X_p and X_n respectively representing the positive and negative frequency components of the inputted complex gain. The detector output is equal to the difference between the magnitudes of X_p and X_n .